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Impression Technique for the Edentulous Mandible*

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DIGEST

Essentials in lower denture construction, such as impression taking, seal, adhesion, and stability are considered. The points to be observed in visual and digital examinations receive mention. The detailed technique and procedure are outlined, particularly with reference to the illustrated areas of involvement, and the materials employed are given. An unusual feature of the article is a listing of the variety of failures encountered in lower denture construction.

The intelligent application of the technique described here is a stride toward eliminating some of the difficulties in edentulous impression procedure, and if the technique is carried out successfully, it will insure a denture base that will have plenty of vertical stability during all mandibular and muscle movements, as well as plenty of horizontal stability, provided the impression is closely adapted to the bony outline of the mandible. The periphery outline is molded to show definite muscle tissue markings, well-rounded, and of a uniform thickness of not less than 3 mm.

With conditions normal, the denture base has its periphery laid at the normal flexion line. Under abnormal conditions the operator should depend on his ability to establish the periphery correctly in the mouth, and not depend on materials.

THE TECHNIQUE THAT follows is not entirely original. Valuable material has been incorporated from various sources. Green, House, Hall, Fish, Fournet and Tuller who have contributed the results of their research, will stand out as founders in the development of scientific denture prosthesis and to them credit is due for the progress and advancement of this service. Every credit is extended to Doctor Fournet and Doctor Tuller for their original ideas and suggestions in stabilizing the lower impression.

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Considerations in Lower Denture Construction

Impression — A good impression should be the first step in denture construction. It should provide adhesion and stability to the finished denture, with comfort to the patient. The success of a good impression depends largely on the accuracy of the peripheral outline and peripheral seal. It is necessary to sustain the denture while lateral strains are being applied during mastication.

Seal: Atmospheric seal is secured in the impression by muscle-molding the peripheral border and extending it into the areas where unbroken contact is secured with movable soft tissues. It should be sufficient to hold the denture in place without interfering with the border tissues while they are undergoing functional movements. Usually the extent of peripheral seal is not more than 2 mm. or 3 mm.

Adhesion: Adhesion is secured in an impression by employing a low softening point impression material and compensating for hard and soft areas. Adhesion will be secured between the impression and mucosa if the balance of tissue tension is uniform throughout and no tissue is displaced beyond physiologic endurance.

Stability: Stability of the lower is secured by extending the heels of the impression buccally and backward until they cover and turn upward on the face of the ramus. Disto-buccally the heels extend into the buccal fold to the external oblique ridge. On the lingual side, the flange is extended downward below the mylohyoid ridge in the first molar and bicuspid region. It does not depend on the lingual undercut for mechanical retention below and behind the third molars but firm contact with the soft tissues is important along the entire lingual side; the upward thrust of the mylohyoid and buccinator muscles are completely subdued and these thrusts are converted into retentive factors. Their exerted energy is employed to hold the impression firmly in place.

Impression Materials—A good impression material should lend itself to easy manipulation, be constant in value, and at all times be under the operator's control. It must be possible to resoften and remold the material to the tissues to secure close adaptation. The material should be one that will record in detail and under the proper amount of tension the extreme functional positions of the tissues. Finally, it should be a material that distributes pressure equally over

the whole tissue area on which the denture base rests.

If the impression material is too soft, the tissues will be placed on either too light a tension or none at all. If it is too firm it will cause the tissues to be displaced beyond physiologic endurance. The impression material that meets these requirements is a low softening point compound, such as Kerr's, Mizzy's or Dresch's impression compound. These compounds are all workable at low temperature, about 135° F. When placed in the mouth the compound rolls up over the flanges of the tray with slight pressure, causing a minimum of tension on the tissues.

It is usually easier to adapt the impression material to the supporting surfaces than to conform it to the peripheral borders. The so-called muscle-molded impression frequently leads to over-extension, whereas the impression not muscle-trimmed is usually under-extended.

To secure peripheral seal it is necessary to employ some plastic material on the periphery of the impression base which is moldable at mouth temperature. Jelenko's adaptol or Kerr's impression wax are materials that meet these requirements.

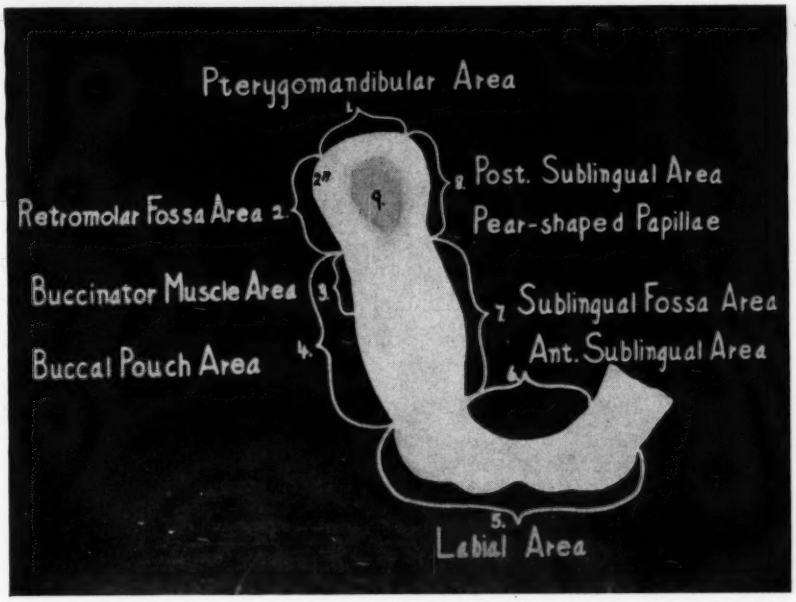


Fig. 1—Diagram of mandible and tissues divided into areas 1 to 9. These are the different areas to approach to take a complete mandibular impression.

Examinations

Visual Examination—Every mouth presents anatomic and biologic factors that should be considered. A visual examination will reveal the health of these tissues, the amount of absorption, the peripheral attachments, the size and form of the vault, ridges, tongue, and throat. Roentgenograms should reveal the health and density of the underlying bony structures and no examination is complete without these aids.

Digital Examination—Survey the physical condition of the tissues carefully to ascertain the possibilities of successful results. Make a digital examination of the mandible and maxilla to know in advance what one may expect to produce in the impressions. Fig. 1 shows the areas of the mandible and tissues which must be approached for a complete mandibular impression.

Technique and Procedure

Preliminary Impression of Mandible—Take an over-sized snap impression. Select a tray that is wide and long. The posterior buccal border of the distal ends of the tray should be bent to curve upward. The purpose of this is to allow the compound to fill the buccal fold, retromolar fossa (Fig. 1, area 2) in order to form a wide buccal roll posterior to the molar area, and to obtain an impression of the tissues as high up as possible on the anterior surface of the ramus, the pterygomandibular area (Fig. 1, area 1).

For the beginner a preliminary and final impression are essential to accuracy, and as much skill should be exercised in taking the preliminary impression as in performing any other part of the procedure.

For flat ridges, select a tray, as recommended by Doctors Fournet and Tuller, or S. S. White lower trays, numbers 101 and 103, or Kerr's lowers, numbers 1 and 3. Bisco's trays, numbers 466 and 467 will be used for prom-

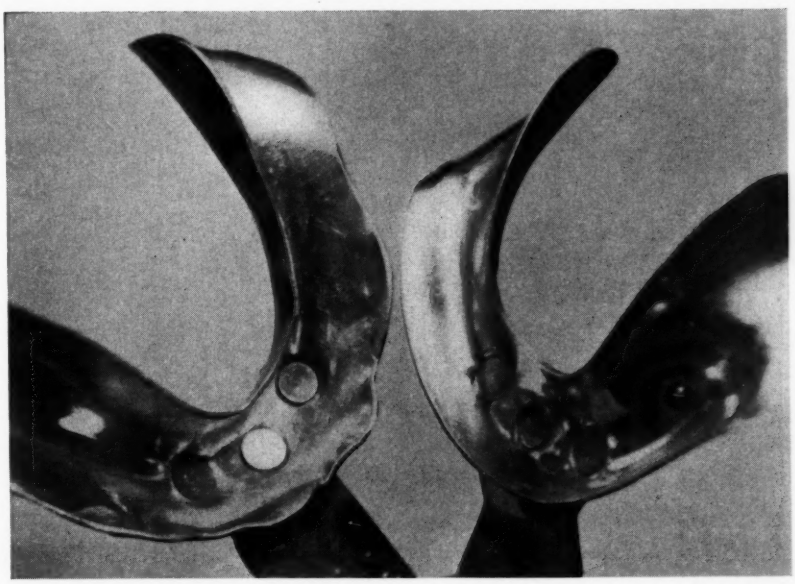


Fig. 2—Before taking the preliminary impression the posterior buccal border of the tray should be bent to curve upward to allow the compound to fill the retromolar fossa.

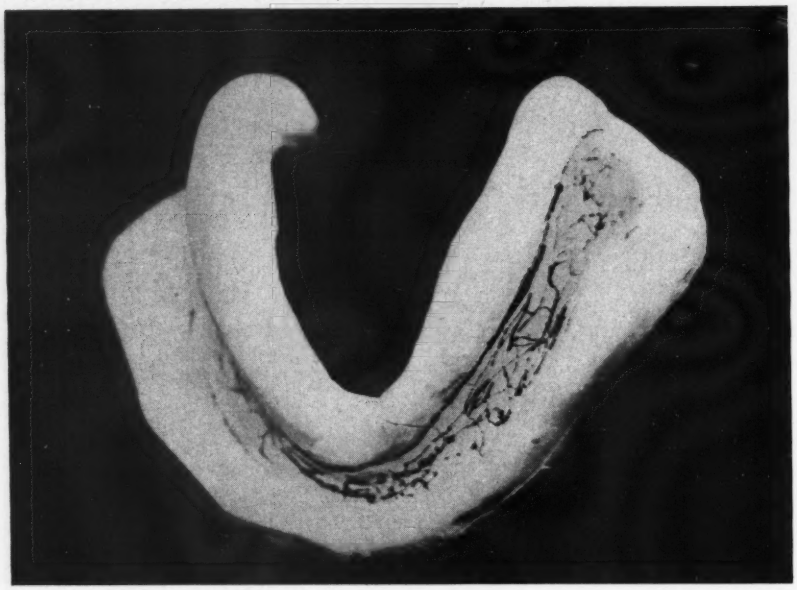


Fig. 3—The preliminary impression should give an impression of the bony outline and a fair amount of muscle-molding. Remove all undercuts and relieve it over the crest of the ridge.

inent ridges. Bend the disto-buccal ends of the tray up and fit the tray to the mandible. Use any low softening point compound, such as Dresch's, Kerr's or Mizzy's. Heat in water at 135° F. and apply to the tray. Insert the compound in the mouth and press down and back, the anterior first, then the heels, with the thumbs on the tray and the fingers under the chin. Press it firmly to the mandible. Instruct the patient to protrude the tongue, raise it as high as possible, then open the mouth widely and pucker the lips as if to whistle, or say "oo." Have the patient place the tongue on the handle of the tray and try to force it out of the mouth while the compound is hardening. Remove the tray carefully by pressing up and back.

This impression must displace all soft yielding tissues and give an impression of the bony outline and a fair amount of muscle-molding. Scrape the impression to remove all undercuts, and relieve it over the crest of the ridge to a depth of 2 mm. and to a width within 3 mm. of the peripheral border. Pour the impression and secure a cast. The lower tray is constructed on this cast.

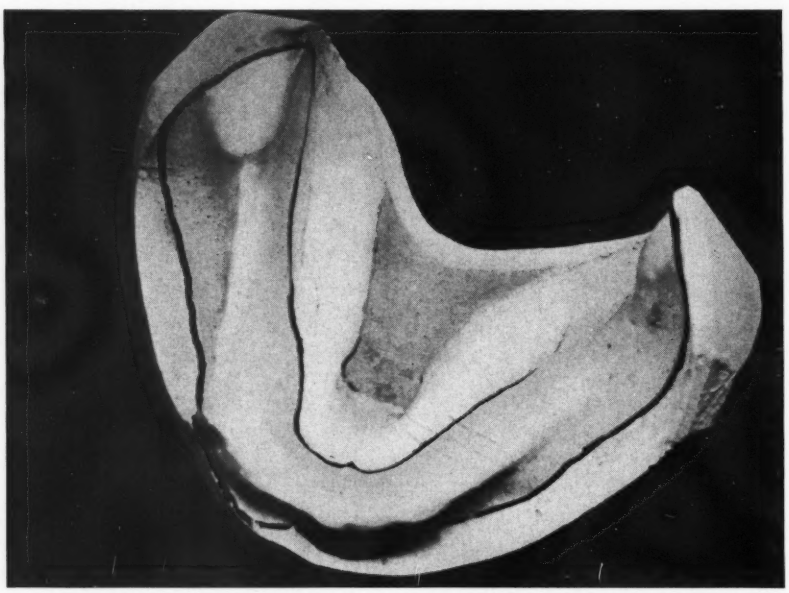


Fig. 4—Draw the outline of the tray on the cast. It should parallel the external oblique ridge as far forward as it can be followed and to the visible muscle attachment in the buccal and labial areas. Lingually it should go to the floor of the mouth as indicated by the partly muscle-molded preliminary impression.

First draw the outline of the tray on the cast with a soft lead pencil. Starting at the disto-buccal area, the outline should parallel the external oblique ridge as far forward as it can be followed and to the visible muscular attachment on the buccal and labial areas 2, 3, 4, and 5 as shown in Fig. 1. Lingually the outline should go to the floor of the mouth as indicated by the impression (areas 6, 7, and 8). At the heels the outline extends across the mandible posterior to the pear-shaped body, area 9, into the retromolar fossa, area 2, with the buccal and lingual corners between areas 1 and 2 and between areas 1 and 8 merely rounded.

Mandibular Trays—Employing a baseplate, such as Ackerman's 13 gauge, S. S. White's special, a phonograph record, permaform, vulcanite, or acrylic resin, construct or adapt it to the cast and then trim it to the penciled outline. Bend a piece of 13 gauge wire to form a handle and fit it to the crest of the ridge. Reinforce the tray along the ridge with baseplate material. Heat the wire in the flame and embed it into the baseplate. Reinforce the tray over the wire and upon the ridge of the tray with a high softening point compound, such as S. S. White's black compound.

Mandibular Compound Tray—Select a tray which approximates the shape of the ridge, Kerr's number 5 lower, for example. Cut the handle off to half an inch length and bend it upward. Adapt the tray to fit the ridge and trim it inside the penciled line. Cover it with a small roll of low softening point compound and press it to place on the model. With the finger manipulate the compound to place and expose the pencil markings. Remove from the model and trim off the excess compound to the pencil line.

Examination of Mouth before Molding or Trimming Tray—A digital examination of the mouth should again be

made. Judge the thickness, strength and flexibility, also attachment of the mylohyoid, masseter, buccinator, levator, obicularis oris, angulioris, and the genioglossus muscles. Note the sharpness of the mylohyoid ridge and the delineation of the external oblique ridge. Take note of the mucous membrane and the condition of the crest of the ridge. Determine the character of the buccinator muscle and the extent to which it may be displaced safely. Note the size and shape of the tongue, its muscular attachment and the extent of control the patient has over it. A thick tongue is more advantageous than a long thin one. Keeping these points in mind, make a digital examination with the tray in the mouth to determine the degree of possible extension in all areas.

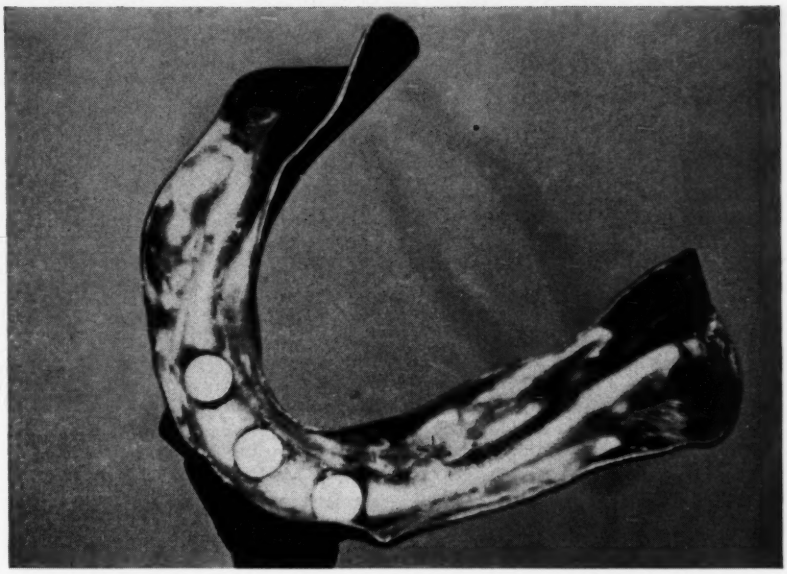


Fig. 5—Adapt the tray to fit the ridge and trim it inside the pencil line. Cut the handle off to a half inch in length and bend it upward.

Muscle-Molding the Compound Tray or Trimming Other Trays—Dry heat or flame the lingual border compound to about 2 mm. in depth but do this with caution. Temper the compound in hot water. Insert it into the mouth and press lightly to the mandible with fingers on the tray and thumbs under the chin. Instruct the patient to raise the tongue while this is being done, to protrude it and place it first in one corner of the mouth then in the other, and finally, to place it against the handle of the tray and press as hard as possible. Remove the impression carefully and chill. Dry heat the labial and buccal border compound with the same procedure. Insert and instruct the patient to open the mouth wide, then attempt to whistle. Remove and chill. At this stage the compound tray will often show a fair muscle-molded border and no further trimming will be necessary. If, however, this is not accomplished, test for stability and trim away the compound in the areas of interference.

Pterygomandibular Area—After any one of the trays has been placed upon the mandible and note has been taken of the pterygomandibular area (Fig. 1, area 1), the upper posterior border of the tray should extend over the pear-shaped papillae, retromolar area, directly in front of the pterygomandibular ligament. The natural activity of the ligament should not be arrested. Soreness will be created if the tissue in this area is distorted. The height of the tray may be judged by instructing the patient to open the mouth wide. The tray should not be displaced if trimmed to correct length. The tray should never exceed the height of the disto-buccal angle, the area shown between areas 1 and 2 in Fig. 1.

Retromolar Fossa—The disto-buccal flange lies in the retromolar fossa (Fig. 1, area 2). The tray should rest upon and parallel the external oblique ridge from the disto-buccal angle to the first molar area (Fig. 1, area 3). The disto-buccal flange is thin with a round, smooth, thick periphery (3 mm.). It can lie beneath the buccal fold of the masseter muscle in perfect physiologic comfort provided it does not distort the buccal fold from a straight line; it is covered at right angles with the buccal fold of the cheek. The disto-buccal flange of the denture should lie in comfort under this fold to secure horizontal stability (Fig. 1, area 2A). If the buccal angle flange extends too high in this

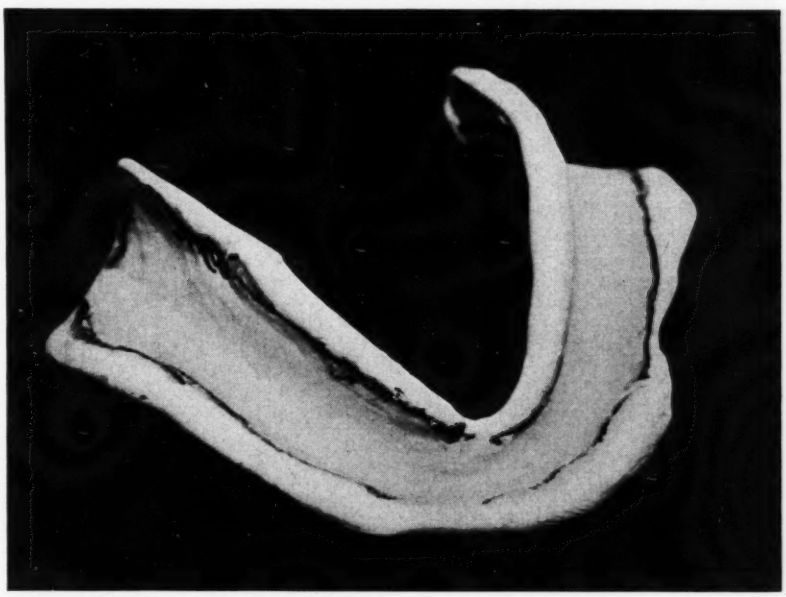


Fig. 6—Cover the tray with a small roll of low softening point compound and press it to place on the cast for transfer of the soft lead pencil markings.

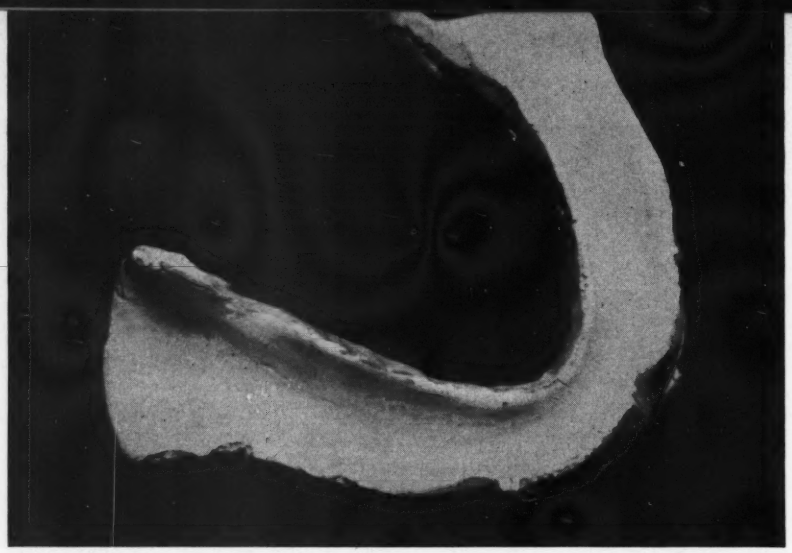


Fig. 7—Trim off the excess compound to the pencil line. Flame the labial and buccal borders and muscle-mold. Flame the lingual border and muscle-mold. The compound tray has its periphery laid at the tissue flexion line.

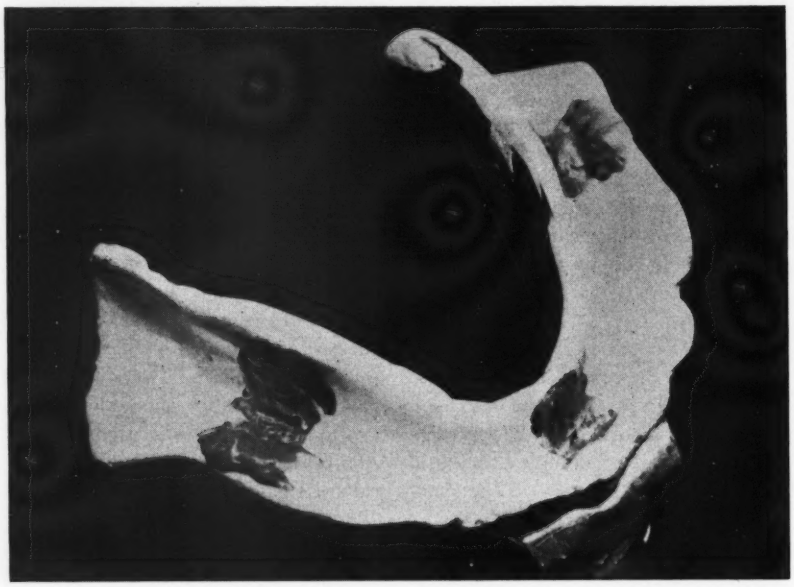
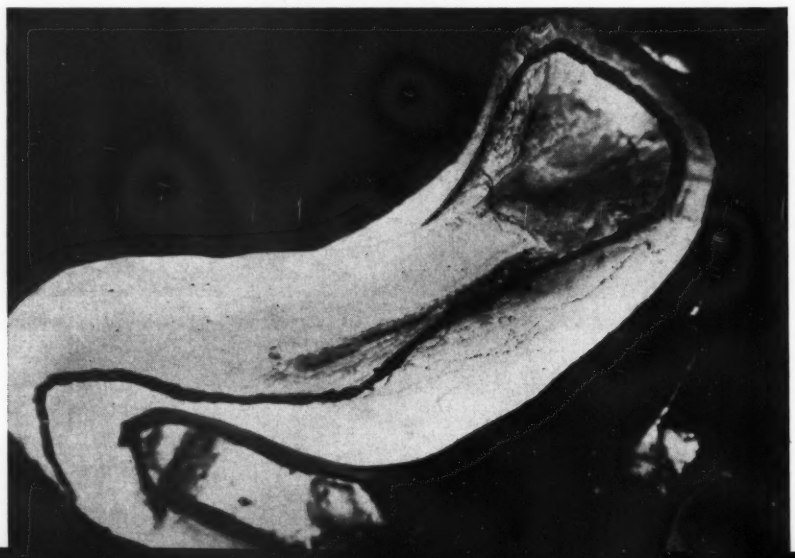


Fig. 8—For ridges covered with a thin mucous membrane, before applying the impression plastic flow a thin film of base-plate wax on the inside of the tray in the anterior and first molar areas to act as stops or to raise the tray slightly from the tissues.

area, it will distort the fold from over-extension, and soreness of the cheek will result. Determine the height of the tray by digital examination. Atmospheric seal and horizontal stability are both lost if the flange in this area is trimmed too low. It must occupy the retromolar fossa and be in firm contact with the external oblique ridge to gain maximum stability in a lower denture.

Fig. 9—Owing to anatomic variations the presence or absence of the notch in the mylohyoid area often means either success or failure in securing stability.



The Buccal Pouch — The buccal pouch, the buccal flange of the tray in area 3, is abruptly trimmed to allow active flexion of the buccinator muscle. The width of the flange in area 3 is considerably less than the retromolar fossa area 2. In area 3 the width is less than both areas 2 and 4. The buccal border of the tray lying in the buccal pouch is determined by pulling the cheek with the thumb and fingers. Trim the tray until it does not rise when drawing the cheek up, in, backward, and forward. The denture base receives an atmospheric seal at the normal tissue flexion line in this area.

Labial Area—Anterior to the first molar area the tray has its periphery laid at the tissue flexion line, which is determined by pulling the corners of the mouth and lip up and in with the thumb and fingers. Trim the tray until it does not rise by the puckering action of the obicularis oris muscle, the inferior levator and frenum labi muscles. The denture base should extend labially far enough in this area (Fig. 1, area 5) to maintain lip contact and a good atmospheric seal.

Sublingual Area (Anterior)—Areas 6 and 7, the anterior and middle sublingual areas represent the major control area on the lingual flange. The periphery of the tray should extend downward as far as possible and still give the tongue freedom easily to lick the upper lip from corner to corner, and reach the roof of the slightly open mouth, without displacing the tray. When atmospheric seal is accomplished in this area a shorter flange, both vertically and horizontally, is permitted in the posterior lingual area (area 8). The muscular inactivity in this area affords a greater degree of effective peripheral seal, whenever the periphery is accurately molded to the proper level of the tissue flexion line.

Sublingual Area (Posterior)—In the posterior sublingual area (area 8) the muscles are active and the depth of the flange in this area is really governed by the depth of the flange in the anterior and middle sublingual areas 6 and 7. It is important to remember that the

deeper the flange in areas 6 and 7, the more shallow area 8 may be and vice versa.

The flange in area 8 does not extend back into the throat or enter the undercut beneath the mylohyoid ridge, to take advantage of mechanical retention in that area. The total depth of the flange is seldom more than one-fourth inch below the mylohyoid ridge and generally ends anteriorly to a line drawn vertically downward from the distal border of area 1.

When this area is too deep, it interferes with the indirect upward lift of the mylohyoid muscle and a distinct notch must be created for its free movement when the tongue is thrust into the cheek. Owing to antomic variations the presence or absence of this notch often means either success of failure in securing stability. The depth of the notch is determined by instructing the patient to place the tongue in the opposite cheek, then press on the handle of the tray without the tray rising. To determine the length of the tray instruct the patient to thrust the tongue out of the mouth without displacing it. When the posterior lingual flange of the denture is over-extended, it will interfere with free movement of the tongue in speech and swallowing, causing intolerable soreness of the mylohyoid muscle and the displacement of the denture. The muscles are active in this area and there should be no displacement of the tissues.

The tray is properly trimmed when it has horizontal stability and is not displaced by any lip, cheek, or tongue movements when held down with light pressure.

Taking the Impression—The final step in the mandibular impression is taken with either Jelenko's adaptol Kerr's impression wax, or any impression material that will remain moldable at mouth temperature and still offer a slight resistance to the tissues.

1. Dry the inside of the tray with hot air and flow a thin film of the adaptol or wax on the entire inside surface of the tray, 2 mm. thick, then over the border of the tray to the outside surface of the periphery to about 3 mm. in thickness. If the ridge is sharp or bony and covered with a thin mucous membrane, flow a thin film of hard base-plate wax on the inside of the tray in the first molar and incisor areas. This will serve to raise the tray from off the tissues slightly. The impression material may then be applied.

2. Dip the tray in and out of warm

Fig. 10—When atmospheric seal is accomplished by extending the periphery into the middle sublingual area, a shorter flange is permitted in the posterior lingual area.

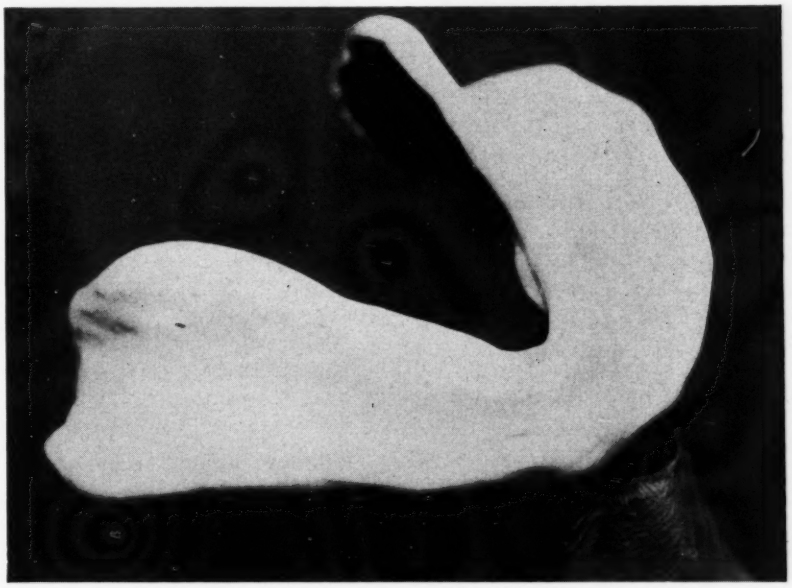
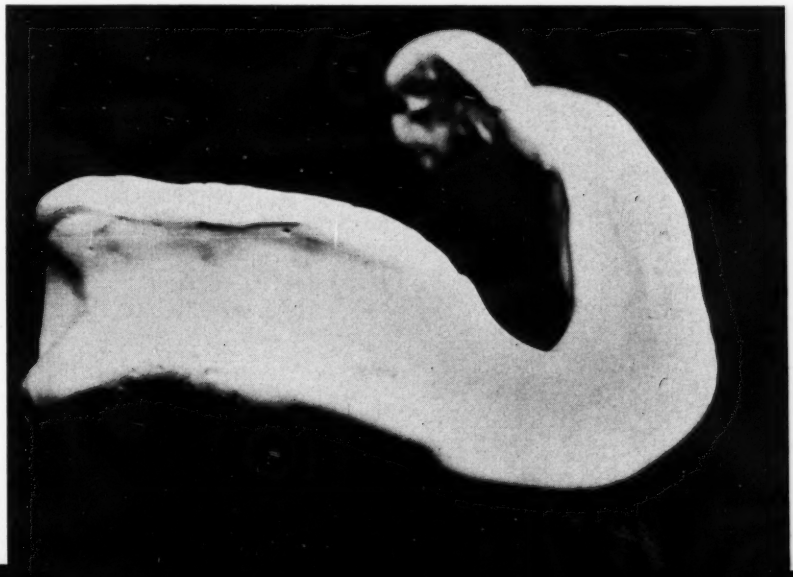


Fig. 11—The depth of the flange in the posterior lingual area is really governed by the depth in the anterior and middle sublingual area and vice versa.

Fig. 12—When the depth of the flange is shallow in the anterior lingual area it is often necessary to extend the lingual flange into both the middle and posterior sublingual areas to secure peripheral seal.



FAILURES

1. FAILURE to recognize biologic factors: diabetes, anemia, syphilis, sclerosis of the liver.

2. FAILURE to ask the patient what he expects of dentures; FAILURE to enlighten him on the subject.

3. FAILURE to secure a good preliminary impression by improper fit of the tray and not partly muscle-molding the compound.

4. FAILURE to remove all undercuts and to relieve over the crest of the ridge.

5. FAILURE to have the base-plate tray not less than 13 gauge thick (Ackerman's or S. S. White's special).

6. FAILURE to trim or muscle-mold the tray properly in the mouth.

7. FAILURE to have sufficient extension up the face of the rami (Fig. 1, area 1).

8. FAILURE to extend and parallel the external oblique ridge (areas 2 and 3).

9. FAILURE to trim the tray abruptly for flexion of the buccinator muscle (area 3).

10. FAILURE to have the buccal border of the tray lie in the buccal pouch (area 4).

11. FAILURE to have the tray with its periphery laid free from puckering action of the lips (area 5).

12. FAILURE to have the periphery of the tray extend downward as far as possible in areas 6 and 7.

13. FAILURE to give the tongue freedom of movement without displacing the tray in areas 6 and 7.

14. FAILURE to extend the flange downward in posterior sublingual area (8), if it is possible to extend it in anterior and mid-sublingual areas (areas 6 and 7).

15. FAILURE to trim the tray until it has horizontal stability and is not displaced by any lip, cheek, or tongue movements when held down with light pressure.

16. FAILURE to provide a notch in the tray for free movement of the mylohyoid muscle in area 8.

17. FAILURE to have the plastic of the proper consistency before attempting to take the impression.

18. FAILURE to secure firm contact with peripheral tissues at flexion line.

19. FAILURE to relieve over-extended areas in the impression and FAILURE to add plastic in soft tissue areas or areas of insufficient extension.

20. FAILURE to relieve the impression over sharp ridges and hard areas (mylohyoid).

21. FAILURE to seat the impression properly, when the compound or plastic is soft or when relieving over-hard tissue area.

22. FAILURE to hold the impression firmly to place while the patient is registering muscle and mucosa flexion movements, and to prevent the impression from sliding forward when the mandibular ridge is curved upward in the molar region.

23. FAILURE to remove surgically flabby tissues which impare stability. The impression should show a fair muscle-molded peripheral border with horizontal stability and peripheral seal without tissue displacement beyond physiologic endurance.

24. FAILURE may occur with patients having rami more obtuse than 80 degrees, flabby muscles, a short frenum linguae; who are tongue-tied, have loosely attached membranes with low tissue tone or have a tongue that is long and thin or short, falling back into the mouth when opened. With some of these conditions, or when the ridge is greatly resorbed it may be necessary to extend the buccal and lingual borders of the impression on to the reflected mucosa of the cheek and on to the floor of the mouth in area 7, to secure added peripheral seal.

water of about 100° F. and press it to place upon the mandible. With the fingers on the tray and the thumbs under the chin in the bicuspid and molar area, press it gently to the mandible with an agitative motion. Instruct the patient to raise the tongue while doing this; hold the tray to place while the patient registers muscle imprint on the lingual border by first placing the tongue to the roof of the mouth and out, then first in one cheek and then in the other.

3. The posterior sublingual border, area 8, is muscle-molded by the patient projecting the tongue from the mouth as far as possible. The middle sublingual border in the molar and bicuspid areas (7 and 8) is muscle-molded by having the patient raise the tongue to its extreme height, with the mouth open, then attempting to feel the buccal borders of the impression with the tip of the tongue. The anterior sublingual border in the incisal area (number 6) is muscle-molded by having the tongue thrust upward, outward, and into each corner of the mouth, then lick the upper lip. Instruct the patient to place the tip of the tongue against the handle of

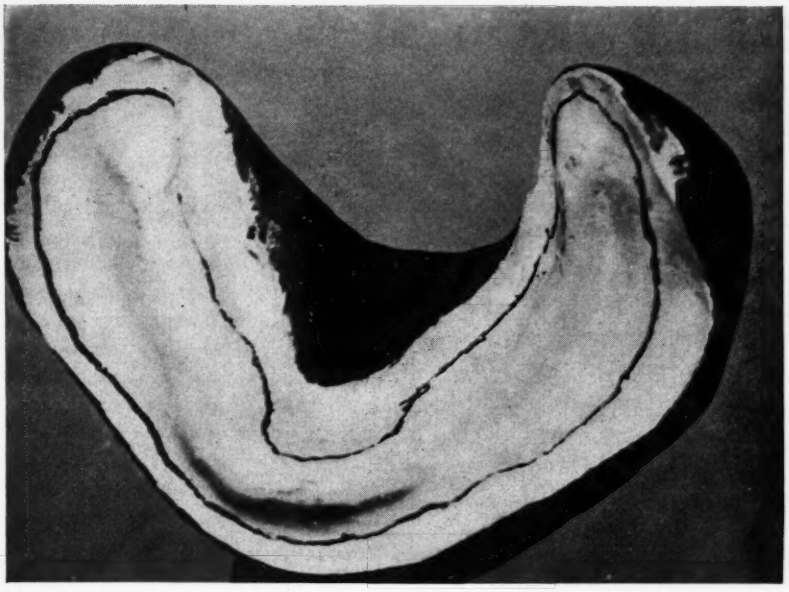


Fig. 13—When the ridge is greatly absorbed, it may be necessary to extend the buccal and lingual borders on to the reflected mucosa of the cheeks and on to the floor of the mouth to secure added peripheral seal.

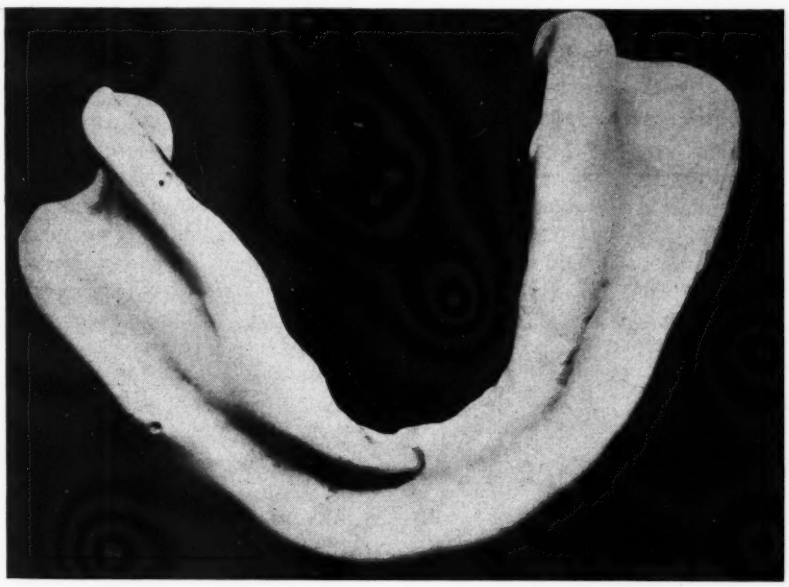


Fig. 14—Impression with buccal and lingual borders extended on to reflected mucosa and floor of the mouth.

the tray and press gently but steadily for 10 or 15 seconds. This tongue action causes muscle and mucosa flexion in the mylohyoid area and will press the impression material against the lingual side of the mandible.

4. Muscle-mold the peripheral border in the retromolar fossa area (areas 2 and 3) and the buccal pouch (3 and 4) by instructing the patient to open the mouth wide and attempt to laugh, then pucker the lips as if to whistle or say "oo" with the mouth open as wide as possible.

5. It is important to hold the tray firmly to place with the fingers on the tray in the mouth and the thumbs under the chin while the patient is registering all these exaggerated muscle-molding movements.

6. If the muscle attachment is prominent, mold the peripheral border, areas 2 and 3, by pulling the cheek up and in with the thumb and fingers. The peripheral border, numbers 3 and 4, is muscle-molded by drawing the cheek up, in, backward, and forward, then the patient is instructed to open the mouth wide. Press the cheeks in at both sides with the fingers. Muscle-mold the labial border, area 4, by drawing the lip up, in, backward, and forward gently.

7. Muscle-mold the pterygomandibular border or the heels of the impression (area 2) by holding the impression in place and instructing the patient to open wide; then move the mandible from side to side as in lateral motion. Remove the impression carefully; chill thoroughly, and trim off any excess plastic material. Chill again. Reinsert it in the mouth and test for stability with the tongue in each position: high, low, medium, and with all exaggerated movements of the lips and cheeks. Watch the seal in the anterior labial and lingual areas, and the lingual bicuspid and first molar area—the latter two, areas 6 and 7, being the lower post-dam area.

8. Relieve all hard tissue areas by heating the plastic over the area with a hot spatula. Insert and press the impression firmly to the mandible over the hard area. This applies especially to the mylohyoid ridge, area 8, which should be over-relieved to prevent soreness.

9. If stability is lost or if the impression is displaced, correct the border where the leak occurs by tracing on more plastic material and muscle-mold that area again. If there is over-extension or pressure spots, however, trim down the tray where the adaptol or impression wax is thin. Replace the plastic with a hot spatula and while soft, insert and repeat the molding movements for that area.

Examine the impression carefully. It should have a thin layer of plastic covering the entire surface of the tray with smooth, round peripheral borders about 3 mm. thick, with no area of the tray exposed through the plastic material.

10. Make a cast of stone and preserve all contour of the muscle-molded periphery.

Medical Arts Building, Toronto, 5.

Extra-Oral Roentgenography of the Mandible

MATTHEW LOZIER, B.S., D.D.S., New York City

DIGEST

The modern practice of dentistry makes the employment of extra-oral roentgenography almost compulsory, particularly for diagnosis and treatment of conditions that cannot be fully determined through clinical means alone even when supplemented by intra-oral roentgenograms. For that reason a tried and proved technique as well as helpful suggestions for extra-oral roentgenography are offered here.

Particular Uses for Extra-Oral Roentgenography

IN THE EXAMINATION OF the mandible, the aid of extra-oral roentgenograms is especially valuable (1) in cases of dental and oral pathosis, when complete or almost complete trismus is present; (2) for examination of an extended infection in the retromolar region; (3) for examination of large areas suggesting pathosis in or about the mandible; (4) for diagnosis and treatment of jaw fractures; (5) for examination of the relationship of the impacted mandibular third molar (when in horizontal or disto-angular position), with the remainder of the body and ramus of the mandible and with the mandibular canal; and finally, an important function (6) for roentgenographic examination of young children when the intra-oral approach is not possible.

Applied Principles

A well known principle in intra-oral roentgenography is equally essential in extra-oral roentgenography. This is the rule for calculating the proper vertico-horizontal angulation through the direction of the central ray at right angles to the imaginary line bisecting the angle formed by the plane of the area under examination and the plane of the film. Failure to comply with this principle explains most of the distortions frequently observed. In intra-oral roentgenography, the two planes forming the so-called angle, the plane of the film and the plane of the area under examination, are necessarily fixed; whereas the plane (path) of the central ray aimed at the imaginary line bisecting the angle is movable or variable inasmuch as it is set each time according to the needs of the individual case.

In the technique to be described here, however, as applied to extra-oral roentgenography of the mandible, this condition does not exist in the same order. Here, the plane (path) of the central ray is fixed. This is true because in order to be transmitted only through the tissues under examination, the ray must always be aimed in the same direction under the angle of the mandible of the opposite side, at about 5 degrees below horizontal, and toward the last lower molar of the side to be roentgen-rayed (Fig. 1, A).

The plane of the mandible under examination (Fig. 1, B), the plane forming one of the sides of the so-called angle, is also more or less fixed here, inasmuch as it must always be inclined as much as the patient's neck will permit, in the direction of the side under examination. (In other words, the plane must be inclined to the right, when the right mandible is being roentgen-rayed and vice versa.) This inclination is also necessary in order to prevent any possible overlapping of the opposite side of the mandible upon the side under examination. The patient's body is to remain at all times perfectly erect.

Finally, reference is made to the film plane (Fig. 1, C) which forms the other side of the so-called angle and which, incidentally, because it can be shifted about, is the primary factor in controlling the location of the imaginary line (Fig. 1, D). To position it properly, the film plane must be inclined away from the mandible, as indicated in Fig. 1. This contracted distance of the film from the mandible will be in no way detrimental to the resulting image.

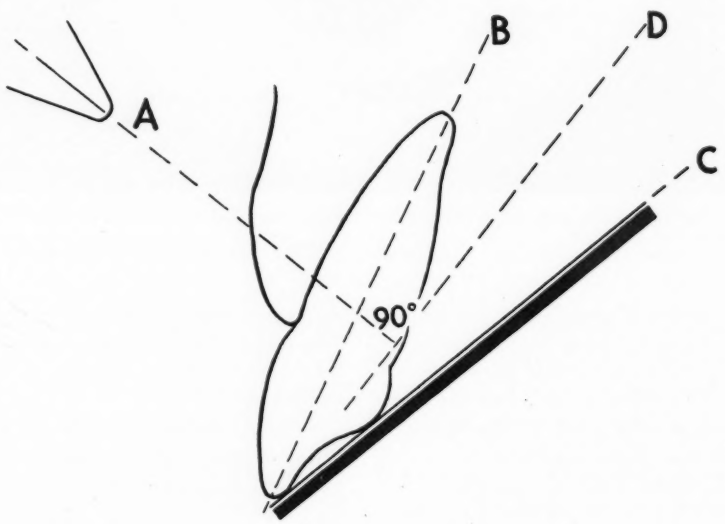


Fig. 1—Ciezynski's rule. A, Direct central ray to imaginary line (D), bisecting angle formed between plane of film (C) and plane of area under examination (B).

Distance

Establishment of proper distance relation of the corresponding cheek and nose to the plane of the film is essential. For examination of the ramus and the lower molars, there should be a distance of about 1½ inches between the side of the nose and the film. For examination of the lower bicuspids and cuspid, the nose should be in close contact with the film. Once the angles of incidence and the position of the film are established and set, they should not be changed.

Mandibular Stabilization and Occlusal Display

The stabilization of the mandible and the clear display of the occlusal surfaces of the teeth under examination are important. This can be readily accomplished by interposing a bite-block between the teeth of the opposite side of the mandible.

For more accurate anatomic display of the tissues, alignment of the plane of the cusps of the molars and bicuspids of the side under examination with the plane of the floor is suggested. For better general perspective, an 18 inch target-film distance is advisable.

Point of Incidence

The exact location of the point of incidence, under the angle of the mandible (Fig. 1, E) should be definitely determined first by palpation, and then by a pencil marking the spot.

Positioning of Film-Holder, Film, and Film-Board

The film-holder or cassette is to be maintained by steady support of the film-board (Fig. 1, F) in the patient's hand. The film, when the 5 by 7 film is used, is preferably placed with its longer surface parallel to the plane of the floor. The film-board is to be positioned about one-half inch below the lower border of the mandible under examination (Fig. 1, G), and is to be maintained parallel with the plane of the floor.

Use of No-Screen Film

The so-called no-screen film allows for better definition, clarity, and contrast, without unduly lengthening the exposure time. The average of 30 milliampere seconds' exposure is adequate here. With the employment of this type

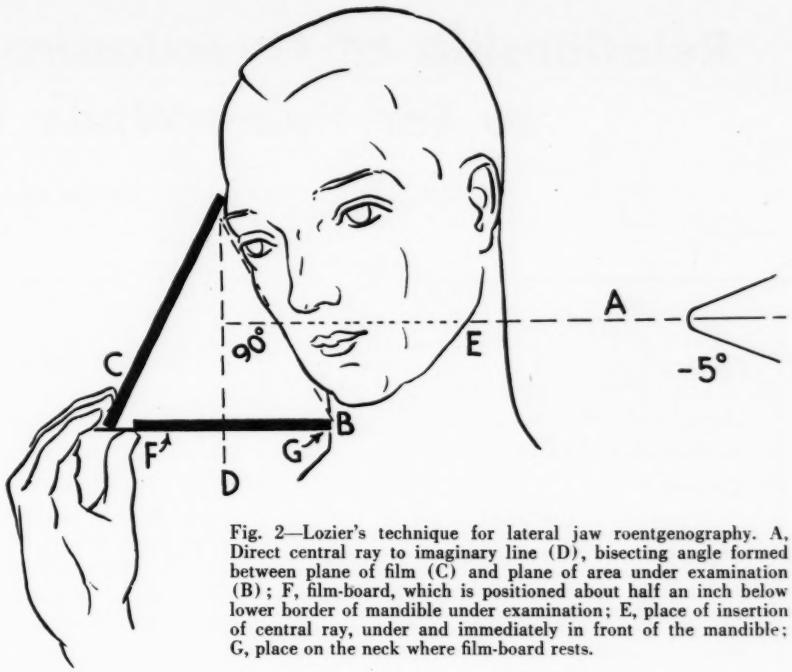


Fig. 2—Lozier's technique for lateral jaw roentgenography. A, Direct central ray to imaginary line (D), bisecting angle formed between plane of film (C) and plane of area under examination (B); F, film-board, which is positioned about half an inch below lower border of mandible under examination; E, place of insertion of central ray, under and immediately in front of the mandible; G, place on the neck where film-board rests.

film, only the ordinary film-holder, one without illuminating screens, should be used. To prevent marring the film and to add protection against light, the film may be loaded with the black paper found originally folded around it.

Developing—For better results, the developing of the no-screen film is to be carried out only by the timing method. The developing time with the regular x-ray developer is eight minutes at 65° F., and six minutes with the Kodalk x-ray developer. A slightly higher temperature of the developer requires a proportionally shorter developing time.

(*Continued on page* 550)

Fig. 3—Extra-oral roentgenogram.

Relationship of Overclosure of Mandible to Ear Pains While Flying

GLENN E. WILLHELMY, D.D.S., Kansas City, Missouri

DIGEST

The effect of pressure changes on pilots' ears in rapid descent is explained.

A report is made of a typical case of ear symptoms from overclosure of the mandible and the successful treatment that was instituted.

DIVE BOMBER, a two word description of Hell! Although originated by the United States Navy several years ago, the Nazis have made "dive bomber" a household phrase the world over. Even the movies in a recent picture have shown the public some of the physical discomfort pilots suffer as a result of this type of flying. Medical research in this field has been carried on extensively during the last twenty years. A great deal of study has been given the effects of decreased oxygen and atmospheric pressure. As the working ceiling of aircraft has gone higher, this field has become increasingly important. I[1] have pointed out the relationship of overclosure of the mandible to stenosis of the eustachian tubes during rapid changes of altitude. There has been little published on this subject outside of military journals.

To understand this subject it is necessary to know something about atmospheric pressures. At sea level there is a pressure of about 15 pounds per square inch and at 17,000 feet, this pressure drops to 7 pounds. Naturally the available oxygen also decreases in like ratios; however, for this article, we are concerned only with pressure.

Effect of Pressure Changes on Pilots' Ears

With the realization that atmospheric pressure decreases with altitude, it can be readily seen that as the pilot ascends, he must adjust his body functions to this decreased pressure. Inasmuch as the ascent is, in most cases, slower than the descent, this is rather easily done. Insofar as the ears are concerned, it is easier for another reason: Air will come out of the middle ear through the eustachian tube easier than it will enter it; therefore, the descent is more important from a pressure standpoint.

In a dive of moderate speed the pressure will increase 6 pounds in about one minute, and at present day terminal velocity, it requires even less time. This rapid increase in pressure puts a heavy load on the eustachian tube. Unless the eustachian tubes function perfectly, disturbances will result.

Doctor Costen[2] has pointed out that patients whose eustachian tubes do not function complain of (1) a stopping or stuffy sensation in the ears; (2) tinnitus, usually a low buzz in type; (3) a snapping sensation while chewing; (4) pain in and about the ears, and (5), most important to flying, dizziness which may be mild or of prostrating severity. Overclosure of the mandible is not the only cause for eustachian tube

[1]Willhelmy, G. E.: Ear Symptoms Incidental to Sudden Altitude Changes, and the Factor of Overclosure of the Mandible, U. S. Naval Med. Bul. 34:533 (October) 1936.

[2]Costen, J. B.: A Syndrome of Ear and Sinus Symptoms Dependent upon Disturbed Function of the Temporomandibular Joint, Ann. Otol. Rhinol. & Laryng. 43:1 (March) 1934.

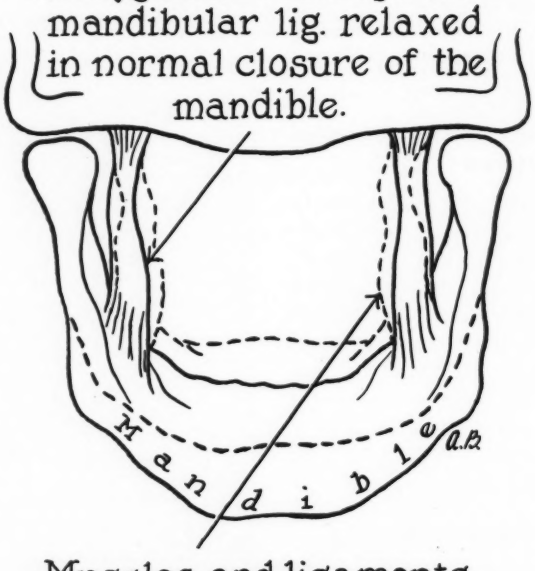

Pterygoid mm. and spheno-mandibular lig. relaxed in normal closure of the mandible.
Mandible
A.P.
Muscles and ligaments greatly relaxed by marked overclosure of the mandible.

Fig. 1

failure but out of a large group of pilots examined[3] 6.1 per cent were found to come under this heading. For the sake of clarity in this article, all other causes will be ruled out and only overclosure of the mandible will be considered as the causative factor.

Report of Typical Case

A veteran pilot who had just landed after a test hop was observed as he walked to the hanger holding his nose and blowing. This is the method used by pilots to ventilate the middle ear and relieve the pain. The pilot noticed that his ears were bothering him more and more and his difficulty in "clearing" them was increasing. He knew that after hard dives, it takes four or five hours before the stuffiness leaves and the ears feel normal again. He had had a little touch of vertigo a time or two but attributed it to "something I ate." The pilot had an appointment with the flight surgeon for his regular physical examination and went direct from the field to the surgeon's office.

Examination—The pilot's hearing was found to be falling off when checked, although nothing organically wrong was found to account for the loss of hearing. No mention was made by the pilot of the stuffiness in his ears or of the vertigo. Oral examination showed a deep overbite, however, so the pilot was sent to the dentist.

Treatment—"Skids" or "splints" were made for the pilot's teeth and he was asked to fly with them for a few days and then return at once to the flight surgeon to have his eustachian tubes opened by means of a nasal catheter and compressed air—this, to insure an open passage to the middle ear. After a few days of flying, the pilot returned to the dentist's office and reported that pain from rapid loss of altitude was gone and that he was able to "clear" his ears simply by swallowing; his hearing had returned to normal; the four or five hour period of stuffiness had disappeared. The vertigo (which was caused by "something he ate") had not recurred.

With this report the "skids" were removed from the pilot's teeth and his vertical dimension was increased by using onlays on the teeth.

[3]Lowry, R. A.: Loss of Intermaxillary Distance, U. S. Naval Med. Bul. 37:367 (July) 1939.

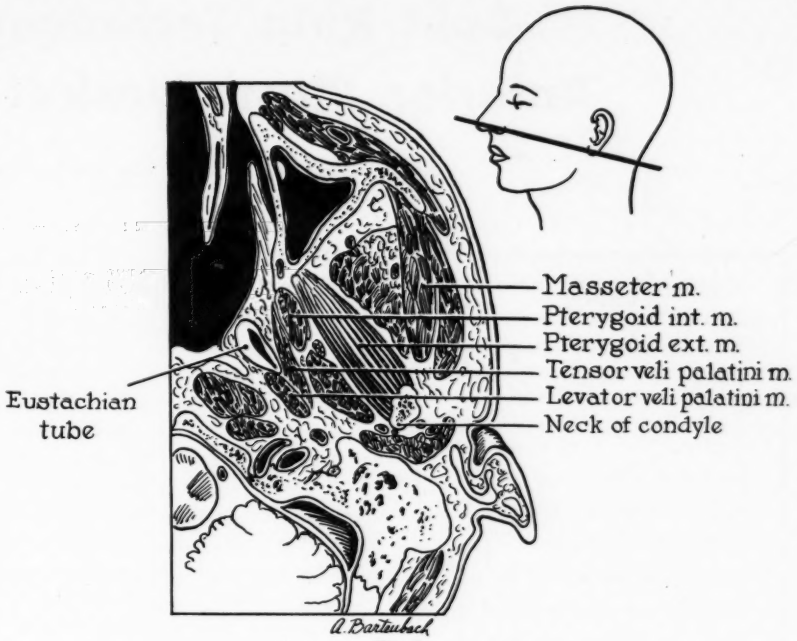
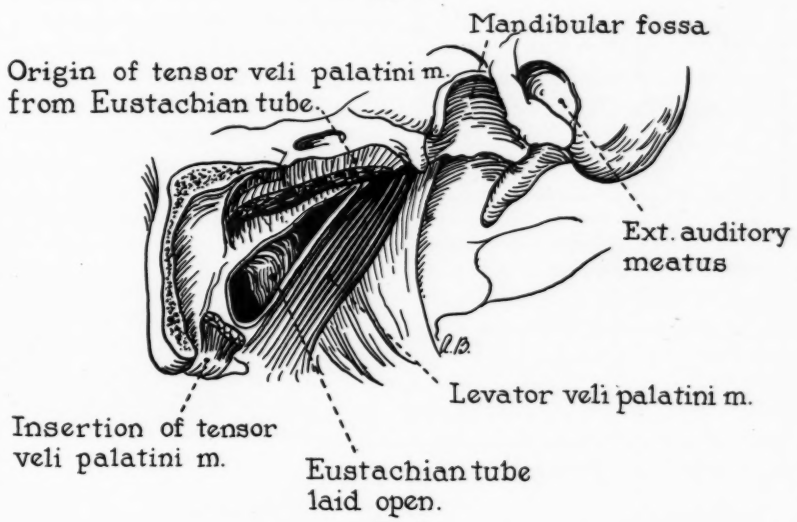


Fig. 2


Mandibular fossa
Origin of tensor veli palatini m. from Eustachian tube.
Ext. auditory meatus
Levator veli palatini m.
Insertion of tensor veli palatini m.
Eustachian tube laid open.
Fig. 3

Comments

The technical procedure is purposely omitted here. There are many excellent methods of opening a bite and any technique is open to controversy. There is, however, one method I would beg dentists not to use; that is a removable appliance when it is possible to use fixed restorations. Removable appliances for permanent bite-raisers are dangerous from a dental point of view. It is impossible for the patient to keep them sufficiently clean to prevent decalification of the occlusal surfaces of the teeth so covered. Unhappily I have had to rebuild many mouths wherein removable appliances had been worn. The dentist who takes an impression of a mouth and has the laboratory make a removable appliance, when it is possible to use either inlays or fixed bridgework, is unfair to his patient and guilty of negligence. In cases wherein removable appliances are absolutely necessary because of loss of posterior teeth, either unilaterally or bilaterally, and when it is necessary to cover the occlusal of some teeth, the patient should be informed of the danger of decalcification of those teeth.

621 *Professional Building.*

Split Ring Technique for Anterior Plastic Jacket Crowns

E. B. HINSHAW, D.D.S., Marysville, Kansas

DIGEST

The use of a split ring consisting of a base with a well in the center for investing the model is suggested for anterior plastic jacket crowns. Dovetails in the rings slide into the groove of the base. The advantage of this method is that the entire surface of the crown can be seen while the crown is being made and minor changes seen to be necessary may be made in the same mold.

THE SPLIT RING equipment (Fig. 1) consists of the base with a well in the center for investing the model. It also has dovetail grooves on each side of the well. Each half of the ring has a dovetail which slides into the groove of the base, so that when in place the line of cleavage is directly through the center of the well.

Technique

1. The model is run up in kryptex in preference to stone, because stone is easily mutilated in removing the finished crown from the stone model.

2. The model is tin-foiled with .001 foil. The tin foil should extend 2 mm. or 3 mm. below the shoulder, so that it may be engaged by plaster when it is invested in the base and will not be disturbed when the halves of the ring are separated.

3. The tin foil is easily adapted to the model by forcing the model covered with tin foil into the end of a cotton roll.

4. The model is waxed in the usual manner and is then ready to be invested in the base.

5. One half of the ring is slid into place and a piece of silk floss is tied around this half of the ring at about the height that the wax model will be in the base. This is to be a guide in investing the model.

6. The wax model is invested with the incisal edge directly under and parallel to the floss. The plaster is brought up around the exposed tin foil within 1 mm. of the wax. A distinct shoulder is made on the outside of the supporting investment (Fig. 2). The shoulder is important as it prevents any lateral play at the line of cleavage. The plaster is smoothed and a separator is applied.

7. A piece of base-plate wax is prepared to close the open part of the ring while being filled with plaster, by cutting out an approximate outline of the supporting investment and waxed model.

8. The half of the ring is now put in place; the base-plate wax is placed against this half of the ring with part of the wax model and investment left exposed; the other half of the ring is brought up against the wax to hold the wax in place while it is being filled.

9. As soon as the base-plate wax can be removed without disturbing the plaster, any excess that may have flowed past the wax on the model or supporting investment is trimmed away even with the surrounding plane. The separator is applied to this half of the ring and the other half is put in place and filled.

10. The ring is heated, separated, and the wax thoroughly removed from the mold. The edge of the mold in each half of the ring is relieved of sharp edges and undercuts, so that when the crown is finally processed, it will be easily separated from each half without breaking the model.

11. The lingual half of the ring is

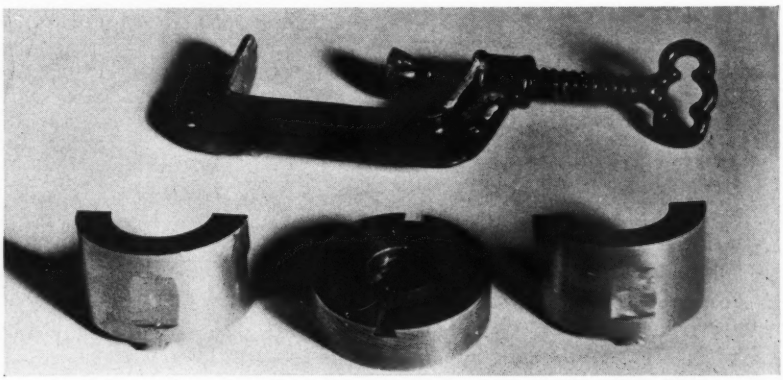


Fig. 1—Split ring equipment consisting of a base (center), with a well in the center for investing model and dovetail grooves on each side of well. Ring is halved and each half has a dovetail which slides into groove. Clamp is used to close rings.

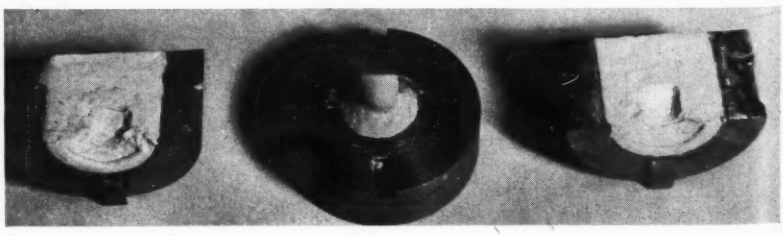


Fig. 2—Supporting investment showing shoulder in separated halves of ring and wax model in base.

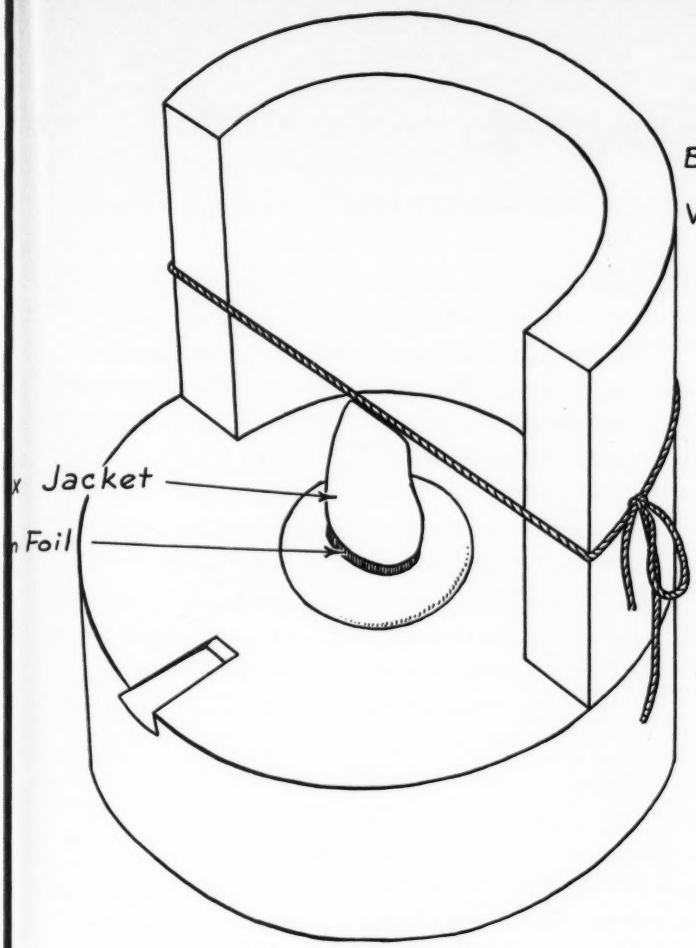


Fig. 3—Wax jacket and split ring.

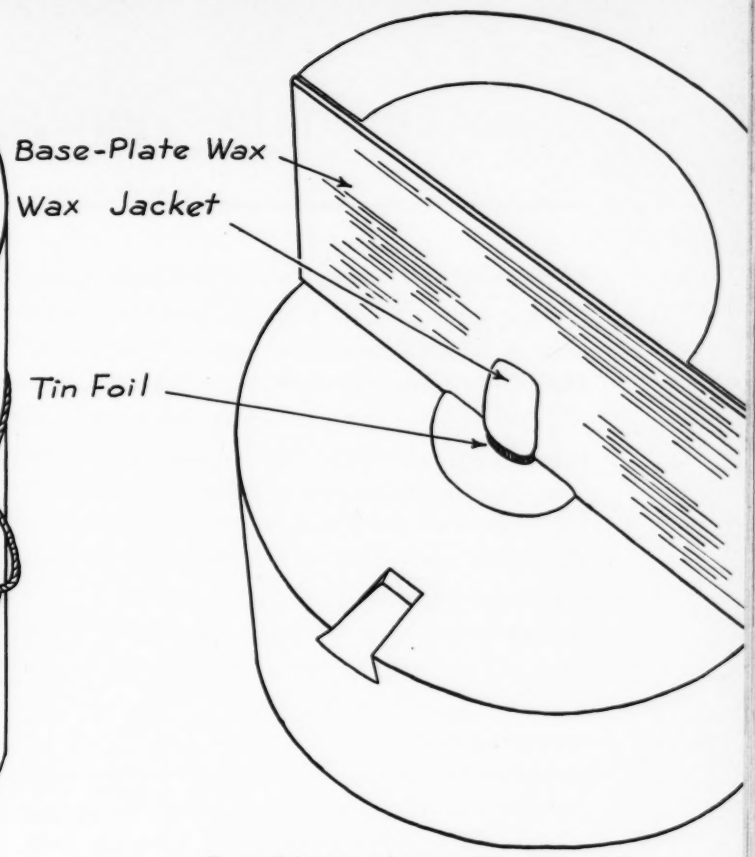


Fig. 5—Split ring with wax model partly invested.

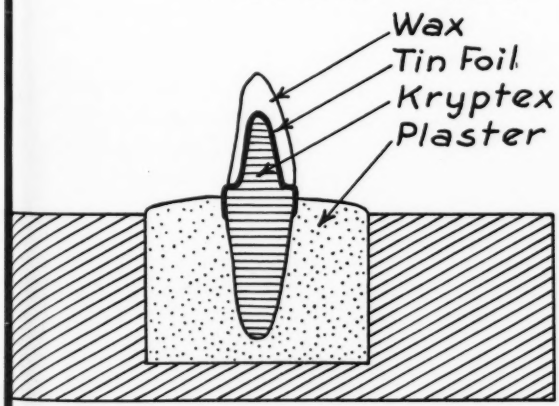


Fig. 4—Cross section showing relationships of materials.

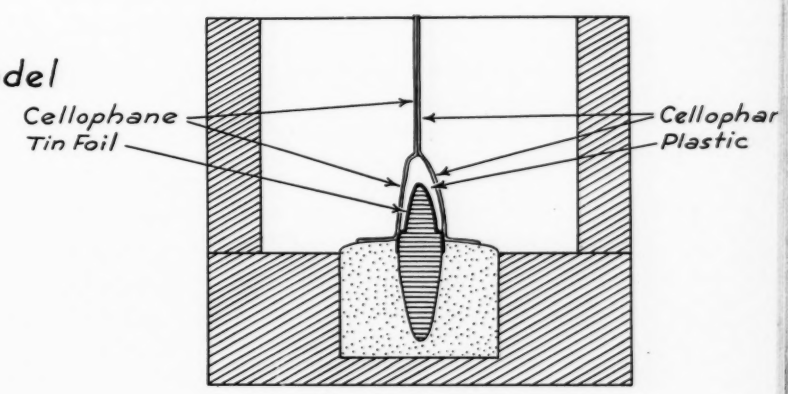


Fig. 6—Cross section showing relationships of materials and parts after ring is assembled.

brought partly to place and a piece of wet cellophane is put on the surface. The plastic, having been prepared, is now packed on the lingual side, and this half of the ring is brought up as far as possible by hand pressure. Plastic is placed on the labial side and a piece of wet cellophane is placed on this half and brought forward as far as possible with hand pressure.

12. The clamp is applied and the ring closed within a half millimeter. The ring is heated for 45 seconds, then chilled and opened.

13. If the cellophane comes away clean, it may be removed and the excess trimmed away with a fine pair of cuticle shears. If the cellophane does not come away clean, it should be heated longer.

14. The cellophane is applied to the two halves again with the rings completely closed with the clamp.

15. The procedure may be followed as many times as desired in adding material and shading.

16. After the proper shade has been obtained, the crown is processed with the two layers of cellophane in place.

17. Upon being processed the ring is chilled and separated (Fig. 2).

18. The excess is ground away with the tin foil being exposed at the base.

(*Continued on page* 550)

The Editor's Page

IN COMMON WITH other glandular tissues the parotid gland is subject to infections and neoplasms. Infections in the gland, according to A. C. Furstenberg,[1] Dean of the University of Michigan School of Medicine, derive from three important sources: (1) the parotid abscess resulting from foreign bodies in the duct, particularly deposits of salivary calculus; (2) infections of the gland that occur as a complication to abdominal operations; (3) inflammatory diseases extending by continuity.

Sialolithiasis[2] or salivary calculus develops in men twice as frequently as in women. Although the submaxillary gland is usually the site of the condition, the parotid gland is often involved. The salivary calculus found within the substance of the gland or along the duct is usually of the same chemical composition as the salivary calculus deposited upon the teeth. Salivary calculus deposited from the saliva and lodged upon the teeth sets up a mechanical irritation, inflammation results, and frequently there is superimposed upon the area of inflammation an infection. The same thing may develop when the calculus is within the gland or along the duct. In such a situation the parotid abscess develops.

Occasionally calculary stones obstruct the lumen of the duct with the development of obstruction symptoms, usually accompanied by sudden, sharp, colicky pain and swelling of the gland. Relief is usually experienced as soon as the calcular pebble is passed or changes its position to relieve the obstruction. In certain cases, however, the obstruction is so complete that surgery is indicated.

Furstenberg prefers the method wherein local anesthesia is used, with injection in the papilla of the cheek which identifies the orifice of Stensen's duct. The duct is probed and when the position of the calculus is located, the duct is slit open and the calculus removed.

Furstenberg warns particularly that this surgical intervention should be followed only in periods of quiescence, and not during an acute exacerbation.

The parotid inflammation associated with abdominal and pelvic surgery is considered to be a dehydration syndrome. In the days before modern surgical procedures when patients were allowed to become dehydrated because of inability to take fluid by mouth or because they lost copious amounts of body fluid by vomiting, bleeding or discharges from wounds, the dehydration syndrome was a common one. Now with the insistence on massive fluid intake by hypodermoclysis and intravenous injection as a routine procedure following surgery, there should be few cases of the dehydration condition associated with the parotid gland. Furstenberg explains this phenomenon as follows: "... it is quite conceivable that the dry gland devoid of a protective flow or secretion may become infected by retrograde extension of mouth flora through the duct, particularly in persons with poor dental hygiene and septic oral cavities ..."

Furstenberg also points out the possibilities of traumatization of the parotid gland by excessive pressure of the anesthetist's fingers during general anesthesia. Parenthetically, another form of traumatization should be kept in mind by all general anesthetists; namely, the possibility of undue pressure on the carotid sinus with its attending dangers. Some surgeons are of the opinion that so-called anesthetic deaths may actually have their origin in the pressure exerted on the acutely sensitive carotid sinus in the neck.

Tumors involving the salivary gland are frequently highly malignant. Any tumor involving the salivary gland should be regarded with gravity. The incidence of highly malignant neoplasms in the gland should suggest to dentists that the first sign of progressive salivary gland swelling observed by them should be regarded with suspicion and their patients immediately referred for surgical consultation. This dictum is a part of the repeated theme on this page: Dentists have the opportunity to be an important first line of defense against general disease as well as local disease. The dentist who does the best job sees the patient as a total entity.

[1]Furstenberg, A. C.: The Parotid Gland: Its Common Disorders, J. A. M. A. 117:1594 (November 8) 1941.

[2]Cecil, R. L.: A Textbook of Medicine, Fourth Edition, Philadelphia, W. B. Saunders Company, 1938, page 678.

Retention Forms for Gingival Inlays

F. C. RUNGE, D. D. S., Houghton, Michigan

INLAYS MAY BE successfully inserted by the technique herein outlined with less injury to the soft tissues than will result from the malleted restoration technique. The alternative employment of silicates, entailing the use of the dam, produces the same gum injuries incident to affixing the clamp, trimming and polishing, which makes the malleted restoration less desirable. The difficulties incident to the correct preparation of the cavity and setting of the inlay are fewer than in the malleted restoration, and the patient's discomfort is minimized.

DIGEST

The basic principle of frictional resistance governs retention, and too much dependence on cement is not good mechanics. Cement fits into the picture in the same manner as glue does in woodworking, and in the latter, absolute approximation of the surfaces to be joined is considered essential.

Cement granules fill the minute inequalities of the tooth and metal surfaces, and constitute the final frictional resistance; but without depth, gingival margin cavities are likely to create unseating problems.

Particularly in that type of cavity in which there is an absence of deep caries (and such cavities embrace eroded surfaces and those having the characteristic white decalcification), preventive cutting is required. The method of anchorage described saves deep cutting, prevents tissue injury, and reduces patient discomfort.

Technique

1. Outline the area to be cut away, and remove all decalcified enamel and dentine. These areas usually extend below the free margin of the gums, and here the first precaution against gum injury must be taken. Enough retention form must be obtained to hold a plug of white base-plate gutta-percha, which, crowded against the gum tissue, will press it back to afford a clear field for operation at the next sitting, and prevent injury to that tissue.

2. At the second sitting the final marginal detail may be effected, a moderate bevel of the enamel margins established, and a flat base provided.

3. Definite seating and maximum frictional resistance to displacement must now be insured. With a round number ½ bur, two pits are cut to a depth judged proper for their purpose: 2 mm. are generally ample. This is followed with a number 700 tapered cross-cut fissure bur, parallelism, which is essential, being maintained. These pits are placed near the ends of the cavity with the objective of avoiding proximity to the pulp. Cutting can best be done in most instances with the bur held in the angle handpiece.

4. The pits can be made smooth by the use of a plain tapered fissure bur of corresponding size; size number 701 is sometimes indicated. The tapered bur cuts the ideal preparation and reduces the likelihood of leaving the wax in the pits.

5. With a number 3 round bur, cut a definite counter-sink over each pit; this will further insure the removal of the pattern without breakage. To take the impression, make a suitably shaped plug of Kerr's regular inlay wax, heat to flowing the end, and force into the cavity. The cavity should be free of debris, but not dry. Press firmly with the finger to fill the cavity and cover the adjacent tooth surface. Do not chill. (The wax should never actually be chilled as dimensional changes are certain to follow.) Hold for two minutes and release. The wax will be found sufficiently hard.

6. Any preferred means of removal may be used—a heated sprue wire is probably best, provided one is careful to withdraw in a straight line to prevent distortion.

7. Upon withdrawal of the wax impression, or pattern, if the direct method is used, ascertain its condition. If all details are sharp and clear, and the pins are as long as the pits are deep, wash with clear water of body temperature. A spray bottle with good air pressure behind it is best. Absorb the moisture and dry all surfaces perfectly with a chip blower. Be sure of absolute dryness.

8. With a small camel's hair brush burnish the wax with fine graphite until the surface shines. This will assist the flow of the investment and produce a smooth casting surface.

9. Proceed immediately to pour or invest to avert dimensional change, using 9 drops of water from an eye dropper to one-fourth a teaspoonful of Ransom & Randolph grey investment, mixing with a spatula on a glass slab in such a manner as to eliminate air bubbles. Allow 20 minutes for setting.

10. To protect the fingers, put the case in a fine mesh tea strainer having a handle and pour boiling water over it; wash the wax from the model. Burnish the model with graphite.

11. If the direct method is used, invest in a heavy mix of grey investment as directed on the can for a single investment with maximum expansion, in a ring lined with not less than two thicknesses of asbestos paper, the mix being freed from air bubbles and always vibrated to place.

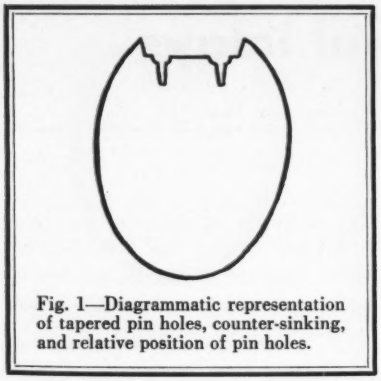


Fig. 1—Diagrammatic representation of tapered pin holes, counter-sinking, and relative position of pin holes.

For the indirect method, after the model has dried, without heat, flow wax to fill the cavity, sprue and invest as for the direct method.

12. For casting, a cherry red heat is required, and this is best obtained in an electric oven. Preheat the gold, put the flask in the machine and cast as quickly as possible. Allow to cool.

13. Remove the casting from the flask and clean. Immerse in hydrofluoric acid to insure absolute removal of silica.

14. Test for fit. Be sure to leave enough of the sprue to facilitate handling, as snug fits make this necessary, and margins may be marred in teasing the casting from the cavity. Leave the sprue on until all marginal trimming and burnishing are accomplished.

15. Finally remove the sprue and complete the polishing of the inlay.

Suggestions

This technique as described applies to most of the anterior and bicuspid teeth, but molar buccal and lingual surfaces will often require the use of a metal tray. Using unannealed copper of at least 30 gauge thickness, cut a tray to fit the requirements of the case, and fit carefully. Sticky wax applied to the surface carrying the wax will hold the inlay wax nicely and prevent separation from the metal.

Always set the inlay as soon after the cavity has been prepared as possible.

To prevent undue sensitiveness, flood the cavity with phenol after the first exposure of the dentine, and place a gutta-percha plug between sittings.

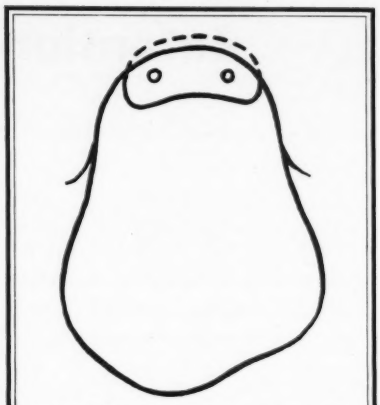


Fig. 2—Gingival margin cavity, with flat base and moderate marginal bevel, showing location of pin holes.

The use of varnishes is contra-indicated.

If any difficulty is experienced in getting the wax to fill the pin holes completely, heat a tapered root canal plugger and with it flow the wax to the bottom of the recesses. The pattern should be held firmly while doing this.

Hall Building.

Extra-Oral Roentgenography of the Mandible

(*Continued from page* 543)

Fixing—Although the film will appear extremely dark when removed from the developer, no particular notice of this need be taken. After the film has been rinsed in cold running water for not less than 15 seconds and then fixed for ten minutes, the superior quality of the resulting image will be readily in evidence. The film may be removed from the fixing solution within 1 or 2 minutes after its immersion for immediate examination and study, but to assure complete fixation and hardening of the emulsion, it should be replaced for another ten minutes, but never longer, and then washed in clean, running cold water for not less than 40 minutes.

Removal of Foreign Particles from Film—Not infrequently, after the film has been washed, certain impure or gritty spots will be noticed adhering to the wet surface. If the film is allowed to dry in this condition, it may be decidedly marred. It is important, therefore, to remove all this foreign matter, which can be done by careful sponging of the film surface with some moistened cotton or a special type sponge.

Drying and Processing—To prevent possible streaking, it is best not to disturb the film during drying until it has completely dried.

The processing operation must meet the required standard if the roentgenographic technique is to be successfully concluded.

369 *East* 149 *Street.*

Split Ring Technique For Anterior Plastic Jacket Crowns

(*Continued from page* 547)

19. An instrument is carefully inserted between the crown and the shoulder in order that it may be lifted off the model without mutilation.

20. The crown is placed in the mouth and ground into place. The outline of translucency of the adjacent teeth is noted and the crown is ground to this outline.

21. The crown may then be returned to the model, and the translucent material added and reprocessed.

Comments

The advantage of this method is that the entire surface of the crown can be seen while being made. Minor changes in shade may be made by grinding the crown and reprocessing in the same mold; or, if the shade is too poor, a new crown can be made in the same mold.

Anterior bridges can be made by applying the same principles in larger equipment.

A posterior crown can be made by using a shorter ring with a cupule for a top for molding the cusps.

804 *Broadway.*

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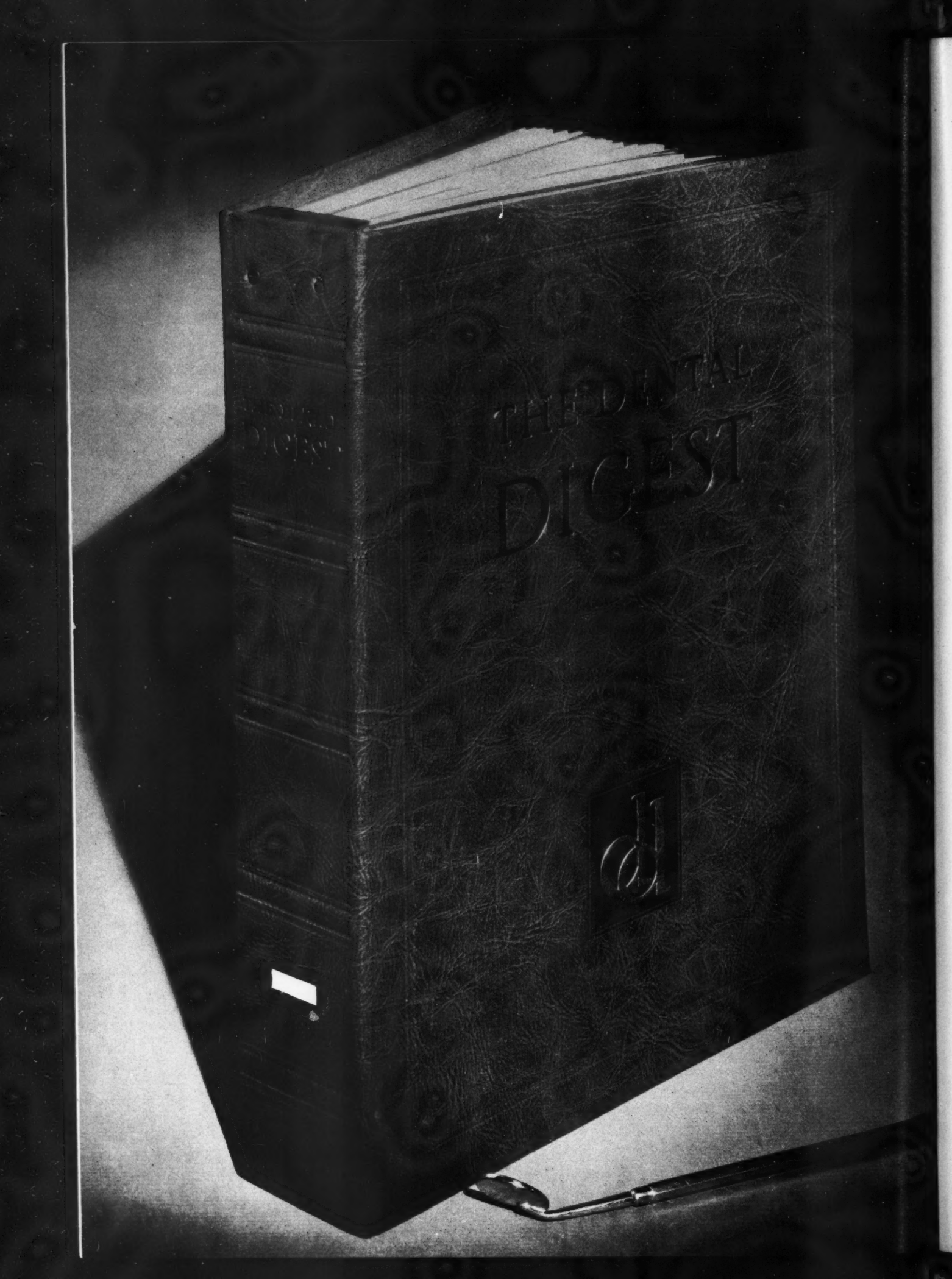
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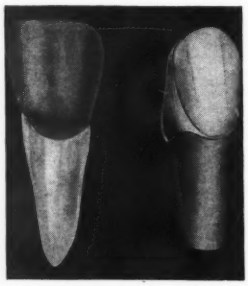

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HR 5674 . . .

A member of the Dental profession, Doctor Philip A. Traynor of Delaware on September seventeenth, introduced in the House of Representatives of the United States a bill to protect the public health by preventing the circumvention of certain state laws regarding the practice of dentistry. This bill is identified as HR 5674 and is directed explicitly at the destruction of the evil of

Suggestions for the use of

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SUGGESTED SYMBOLS

Each dentist may develop his own system of symbols but the following specific markings have been found simple and adequate:

Soft Lead Pencil—(a) Porcelain fillings are indicated by a pencil outline.

(b) Porcelain jacket crowns and bridges are shown by cross-hatching with lead pencil across the corresponding tooth or teeth on the chart.

(c) Missing teeth are blocked out with a soft lead pencil.

(d) Abrasions are represented with a soft lead pencil.

Blue Pencil—(a) Cavities are indicated with blue pencil.

(b) Advisable restorations are demonstrated with blue pencil.

Red Pencil—(a) A red line is used to indicate the presence of a root canal filling.

(b) A red outline shows the presence and position of an impacted tooth.

(c) Red pencil is used to represent pulp involvement.

(d) A red "X" is made across a tooth to indicate that its extraction has been advised.

(e) Pyorrhea pockets are represented in red along the crest of the alveolar ridge (and a notation is made at the bottom of the chart if extensive gingivitis is present).

1. The Ryan Examination and Treatment Record may be had in pads of fifty charts each. These pads fit conveniently in a standard 9½ by 11½ inch loose-leaf notebook which may be purchased at a five-and-ten cent or variety store.

2. Alphabetical dividers may be made by using a ten cent package of plain white paper of the same size as the charts with holes punched at the same distances, and a fifteen cent box of alphabetical index tabs. The holes are reinforced.

3. It is a good plan to keep a blank sheet of paper between the charts to prevent possible smearing of crayon or pencil markings; but this is not essential.

4. A fresh pad of charts may be kept ready for use in back of the notebook of active records.

5. The various types of restorations and their location in a particular mouth are shown with the use of polychrome pencils—gray, for amalgam; deep yellow, for gold. White pencil does not show up very well; consequently, porcelain may be indicated with soft lead pencil outlines or cross-hatching.

6. Spaces provided beside the quadrants with numbers corresponding to the teeth permit special notations concerning each tooth. As treatment progresses the blue markings indicating needed dentistry are erased, and the nature, location, and date of placement of each new restoration are recorded. Additional clinical notations are made if necessary in the space provided for that purpose below the chart itself.

7. It is essential to be consistent in any system of symbols or markings developed. To insure consistency, it is well to have a key page in the front of the notebook.

8. The exact record of conditions found in the average patient's mouth at the original examination can be completed in fifteen or twenty minutes, and the time it takes to keep a chart up to date is negligible.

9. When a chart is completed the necessary data (name, address, telephone, reference, estimate, and terms) are typewritten in the spaces provided at the top of the record. The date of the original examination is also recorded in order that the treatment dates (as shown in the quadrants at the sides of the chart) will be recognized as subsequent to the date of the original examination.

10. Provision is made on the back of the chart for bookkeeping records. This is merely for the convenience of dentists who wish to keep all records together, but may be ignored by dentists who have a satisfactory bookkeeping system which they need not discard or do not wish to discard. The Ryan Examination and Treatment Record may be employed as an additional or supplementary record to any established method of record-keeping dentists may have.

11. Although the Ryan Examination and Treatment Record was designed for the dentist's own convenience in his practice, the charts have been found to have a definite informative value in explaining conditions to patients. The charts are also particularly helpful in reporting dental conditions of patients to cooperating physicians.

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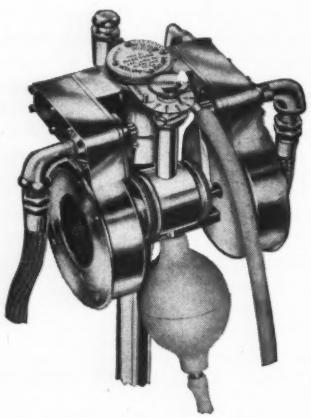

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Unveiling . . .

Four obscure lines in a Chicago paper announced the death on November sixteenth of Barnabas F. Philbrook, "retired dentist who was credited with the invention of the cast gold inlay." Few in the dental profession, other than the dental historians, know that Philbrook, while practicing in a rural community in Iowa, used gold inlays ten years before Taggart announced his discovery to the dental world. In 1897 Barnabas F. Philbrook appeared before his confreres, no more than ten of them, and presented a paper on cast fillings. It was ten years later that Taggart announced the method of making gold inlays for which he later attempted to exact royalties and a tribute from the profession. Taggart went to his grave at the age of 78, an embittered man who had not profited from the invention that put millions of dollars in the pockets of his dental colleagues. Philbrook died in his eighty-ninth year. He had practiced dentistry for fifty-eight years. His name was seldom mentioned in dental circles and he certainly did not receive the credit to which he was justly entitled. We have treated our dental immortals rather shabbily.

There are many men living and practicing dentistry today who have made important contributions. Too often these men do not receive the recognition to which they are entitled. One thought may sustain them:

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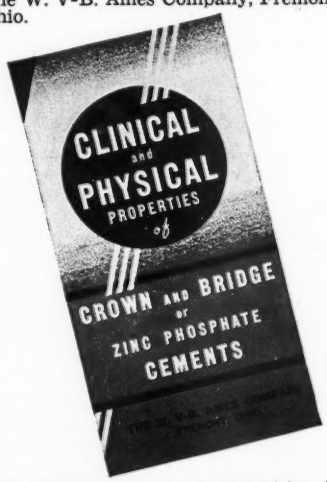

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Houston Episode . . .

Certainly the lobby of the Rice Hotel in Houston was large enough to accommodate whispering dental politicians during the convention. By two's and three's and by larger numbers, conspirators ("breathers together") could be seen. Two women, apparently attending their first convention with their dentist-husbands, were overheard in the elevator while conjecturing as follows:

"Mabel, what are all the men whispering about? Are they telling dirty stories?"

"I don't think so, Beulah. They're talking politics. In fact, I heard that they're grooming Doctor So-and-So to run as a black horse."

Nonagenarian . . .

One of the most refreshing observations at the Houston meeting was to see the 92 year old S. Blair Luckie who is still practicing in Chester, Pennsylvania where he has worked continuously for 68 years.

Thank You Notes . . .

The great Sir William Osler was more than one of the outstanding men of medicine. He combined his great clinical skill, his superb understanding of people and their diseases with an elegant power of expression. It was he who exhorted his colleagues thus: "When you have made an observation of value or reached a conclusion concerning the unusual, publish it. Avoid carrying unpublished knowledge to the grave."

So much for the people who write of their experiences, but how are they to know what good they do and how much appreciation they receive? Unfortunately most of us are quick to receive knowledge but slow to acknowledge it; anxious to learn but hesitant to teach; avaricious to take, but reluctant to give. The men who help us in our practices by improving our knowledge and our techniques do not make their contributions under the sign of the dollar. Their motives are, for the most part, entirely altruistic, but they do appreciate a friendly word of gratitude and are encouraged by it.

George E. Cox of Wilmington, Delaware, has made a fine suggestion along

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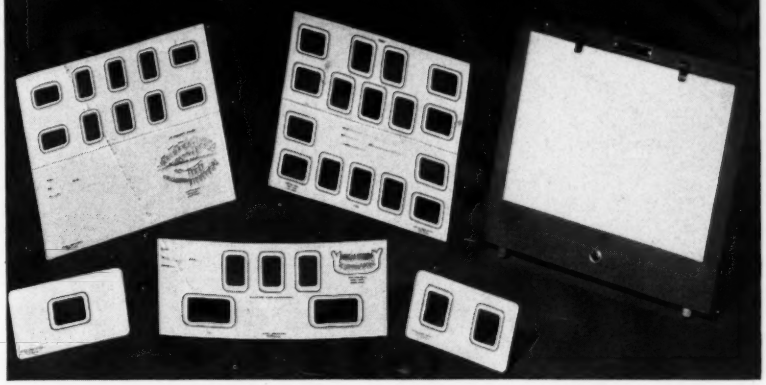

In radiographic viewing accessories —just as in x-ray films, exposure accessories, chemicals, processing accessories—the Eastman line is *complete*. Eastman viewing accessories include: (1) Twelve types of bristol-board mounts for periapical and for *Bite-Wing* radiographs, from single- to eighteen-opening. (2) An illuminator that accommodates all of the mounts, as well as individual radiographs up to 8″ x 10″.

Eastman Dental Film Mounts provide an opaque frame for each radiograph and space in which to mark data—some have anatomic charts; the radiographs quickly slide into slots. *Eastman X-ray Illuminator, Model D*, provides evenly diffused illumination of north-daylight quality . . . has a switch on the front . . . is finished in dark gray lacquer. Ask the dental salesman who calls on you regularly, for complete information about these efficient Eastman products. . . . Eastman Kodak Company, *Medical Division*, Rochester, N. Y.

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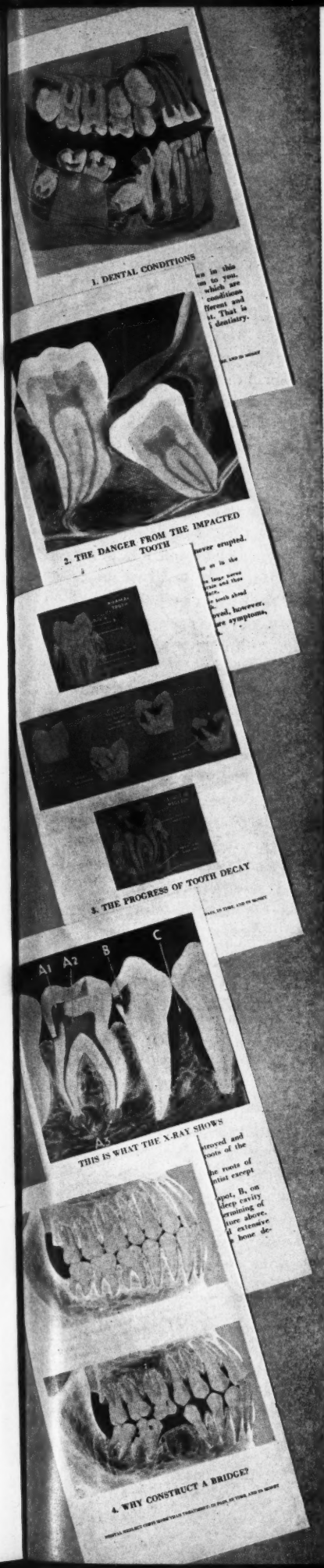
Airing Our Failures . . .

Every once in a while these dissenting opinions carry the suggestion that good might be accomplished by talking more about our failures in practice and less about our successes—nebulous and otherwise. Recently the orthodontists have done just that: They presented a symposium on orthodontic failures. One rich note in this excellent series was sounded by the eminent pediatrician, Clifford Sweet of Oakland, California, writing in the October issue of the *American Journal of Orthodontics and Oral Surgery*. Doctor Sweet emphasizes the importance of the simple things in the life of the child, such as body mechanics, correct posture, correct walking habits, proper sleeping habits and adequate nutrition. One part of his talk seems to give the clue to many malocclusions among present-day children:

"When the child suckles at his mother's breast he does not actually suckle so much as he chews. He must bring his jaws up to perpendicular apposition in order to get milk out of his mother's breast. While, when he is fed one of these damnable, long nipples that are commonly used on a nursing bottle, he does not use his jaws at all but, seizing the nipple between his tongue and his hard palate, he simply pushes it with his tongue to get the milk out. And repeatedly we have seen a potential Andy Gump."

It was a dentist, Ramaker, who first pointed out that the child in his tortuous passage through the birth canal may displace the facial bones in such a fashion as to produce a malocclusion, particularly because of the mechanics exerted upon the head at birth. It was Ramaker who first pointed out and is now receiving confirmation from Clif-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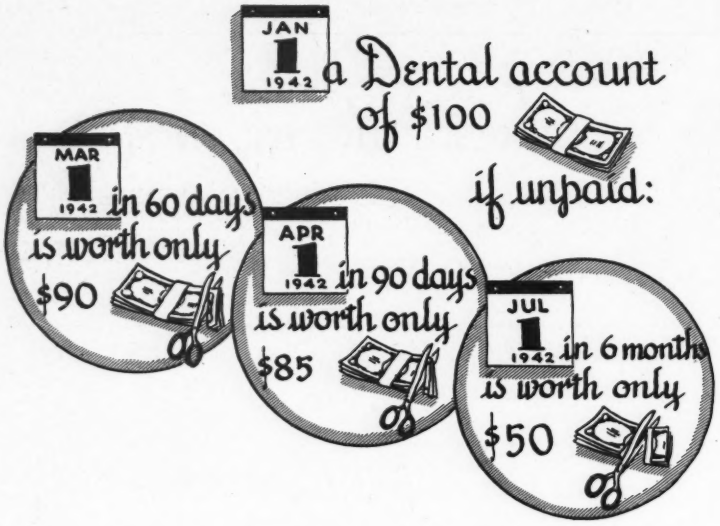
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PLEASE REMIT—OR ELSE!

That's the curiosity-provoking title of Doctor Chivian's December ORAL HYGIENE article about pitfalls dentists encounter in dealing with collection agencies . . . This month's O. H. also features terse quotes gathered at the Houston meeting of the A.D.A. . . . and Doctor Peter T. Swanish, distinguished economist, in "Mistake Not the Shadow for the Substance," warns that although the best intentions in the world may underline a particular legislative measure, the practical results for dentists may be something far different from what is expected . . . A dental assistant, Dian Gardner, tells of patients that annoy her, in "Purely Personal Peeves" . . . Doctor Allan D. Wintner, in "Are Subsidies an Answer?", replies to Doctor S. C. Brown's September article . . . "I am Now a Happy Dentist" confesses Doctor William Raskin, after he found the true meaning of service to patients . . . And ORAL HYGIENE's popular departments, Ask ORAL HYGIENE, and Technique of the Month, and Editorial Comment, and Military and Defense News, and Dentists in the News, and Laffodontia, along with the not too-popular Publisher's Corner, round out the December number. This issue also carries a complete index of this year's content.

In your December

Oral Hygiene

ford Sweet that the breast-fed infant is more likely to have a well-developed face and well-developed jaws than the one artificially fed.

It would be a sweeping and unscientific generalization to say it, but some facts do seem to suggest that the child who has a mother who insists on pediatricians' feeding formulas, who attends all the lectures on child hygiene, but who, for want of time or because of vanity, keeps the child from her breast—these facts suggest that such a child is likely to be a subject for future orthodontic attention.

The points to be emphasized are these: The beneficial result of the mechanics of suckling and the effect upon the structures of the face and jaws; and the fact that mother's milk is generally accepted by nutritionists to be far superior to any artificial substitute.

The more we observe the field of dentistry, the more we should be impressed with the biologic ramifications and vastness of the issues that confront us. Dentistry is not simply a mechanical process. Dentistry is concerned with human tissues that respond in a multitude of ways. The response is often unpredictable. No two cases that confront us are ever alike. No two results are identical. And so far we have never reached perfection. Such a simple dental procedure as an occlusal restoration cannot be done without the most exacting care and effort. And after it is finished, if we look at our handiwork critically and objectively, we know that it missed the ultimate goal of perfection. That should not discourage us but stimulate us to strive again. I believe that is in part what Doctor Sweet meant when he said:

"Every human being grows up mentally and then he has to grow up emotionally before he becomes an adult. And the best sign that I have known that a person has become an adult is that he becomes introspective. He begins to examine himself and questions his motives and results."—E. J. R.

HAVE YOU RENEWED YOUR SUBSCRIPTION FOR 1942?